

CPC**COOPERATIVE PATENT CLASSIFICATION****E04C**

STRUCTURAL ELEMENTS; BUILDING MATERIALS (for bridges [E01D](#); specially designed for insulation or other protection [E04B](#); elements used as building aids [E04G](#); for mining [E21](#); for tunnels [E21D](#); structural elements with broader range of application than for building engineering [F16](#), particularly [F16S](#))

E04C 1/00

Building elements of block or other shape for the construction of parts of buildings (of relatively thin form [E04C 2/00](#); structural elongated elements designed for load-supporting [E04C 3/00](#), e.g. columns or pillars [E04C 3/30](#); manufacture or material of building bricks, stones, or the like [B28](#), [C03](#), [C04](#); paving elements [E01C](#); general building constructions [E04B](#), e.g. walls [E04B 2/00](#), floors [E04B 5/00](#), roofs [E04B 7/00](#), ceilings [E04B 9/00](#); {roof coverings [E04D](#); coverings for walls or ceilings [E04F 13/00](#); floorings [E04F 15/00](#)} structural elements specially designed for built-in conduit shafts [E04F 17/00](#); {elements for buildings for particular purposes [E04H 7/00](#)}; special elements for building ovens or furnaces [F24B](#), [F27D](#))

E04C 1/24

- . Elements for building-up floors, ceilings, roofs, arches, or beams ([E04C 1/39](#) to [E04C 1/42](#) take precedence; flooring [E04F 15/00](#))

E04C 1/34

- .. designed for use as filling elements

E04C 1/36

- ... between joists or girders

E04C 1/38

- ... in ribbed or cross-ribbed floors, ceilings, or roofs consisting of reinforced concrete

E04C 1/39

- . characterised by special adaptations, e.g. serving for locating conduits, for forming soffits, cornices, or shelves, for fixing wall-plates or door-frames, for claustra

E04C 1/392

- .. {for ventilating, heating or cooling}

E04C 1/395

- .. {for claustra, fences, planting walls, e.g. sound-absorbing (pots for vertical horticulture [A01G 9/022](#))}

E04C 1/397

- .. {serving for locating conduits ([E04C 1/392](#) takes precedence)}

E04C 1/40

- . built-up from parts of different materials, e.g. composed of layers of different materials or stones with filling material or with insulating inserts

E04C 1/41

- .. composed of insulating material and load-bearing concrete, stone or stone-like material

E04C 1/42

- . of glass or other transparent material ({panels made of glass bricks [E04C 2/546](#))}

E04C 2/00

Building elements of relatively thin form for the construction of parts of buildings, e.g. sheet materials, slabs, or panels (materials or manufacture, see the relevant subclasses, e.g. [B27N](#), [D21J](#); made in situ [E04B](#); specially designed for insulation or other protection [E04B 1/62](#); load-carrying floor structures [E04B 5/02](#), [E04B 5/16](#); roofs consisting of self-supporting slabs [E04B 7/20](#); roof or like covering elements [E04D 3/00](#); for lining or finishing [E04F 13/00](#))

E04C 2/02

- . characterised by specified materials (translucent [E04C 2/54](#))

E04C 2/04

- .. of concrete or other stone-like material; of asbestos cement; {of cement and other

- mineral fibres}([E04C 2/26](#) takes precedence; material or manufacture [B28](#), [C04](#))
- [E04C 2/041](#) ... {composed of a number of smaller elements, e.g. bricks, also combined with a slab of hardenable material}
- [E04C 2/042](#) {Apparatus for handling the smaller elements or the hardenable material; bricklaying machines for prefabricated panels (**bricklaying machines in general**[E04G 21/22](#))}
- [E04C 2/043](#) ... {of plaster ([E04C 2/049](#) takes precedence)}
- [E04C 2/044](#) ... {of concrete ([E04C 2/049](#) takes precedence)}
- [E04C 2/049](#) ... {completely or partially of insulating material, e.g. cellular concrete or foamed plaster}
- [E04C 2/06](#) ... reinforced
- [E04C 2/08](#) .. of metal, e.g. sheet metal ([E04C 2/26](#) takes precedence)
- [E04C 2/10](#) .. of wood, fibres, chips, vegetable stems, or the like; of plastics; of foamed products ({[E04C 2/049](#)}, [E04C 2/26](#) take precedence; {hydraulic cement and mineral fibres [E04C 2/04](#)})
- [E04C 2/12](#) ... of solid wood
- [E04C 2/14](#) reinforced
- [E04C 2/16](#) ... of fibres, chips, vegetable stems, or the like
- [E04C 2/18](#) with binding wires, reinforcing bars, or the like
- [E04C 2/20](#) ... of plastics
- [E04C 2/205](#) {of foamed plastics, or of plastics and foamed plastics, optionally reinforced}
- [E04C 2/22](#) reinforced {[E04C 2/205](#) takes precedence}
- [E04C 2/24](#) ... laminated and composed of materials covered by two or more of groups [E04C 2/12](#), [E04C 2/16](#), [E04C 2/20](#)
- [E04C 2/243](#) {one at least of the material being insulating}
- [E04C 2/246](#) {combinations of materials fully covered by [E04C 2/16](#) and [E04C 2/20](#)}
- [E04C 2/26](#) .. composed of materials covered by two or more of groups [E04C 2/04](#), [E04C 2/08](#), [E04C 2/10](#) or of materials covered by one of these groups with a material not specified in one of the groups {(of cement and mineral fibres [E04C 2/04](#))}
- [E04C 2/28](#) ... combinations of materials fully covered by groups [E04C 2/04](#) and [E04C 2/08](#)
- [E04C 2/284](#) ... at least one of the materials being insulating
- [E04C 2/288](#) composed of insulating material and concrete, stone or stone-like material
- [E04C 2/2885](#) {with the insulating material being completely surrounded by, or embedded in, a stone-like material, e.g. the insulating material being discontinuous}
- [E04C 2/292](#) composed of insulating material and sheet metal
- [E04C 2/296](#) composed of insulating material and non-metallic or unspecified sheet-material ([E04C 2/288](#) takes precedence)
- [E04C 2/30](#) . characterised by the shape or structure (**translucent** [E04C 2/54](#))
- [E04C 2/32](#) .. formed of corrugated or otherwise indented sheet-like material; composed of such layers with or without layers of flat sheet-like material
- [E04C 2/322](#) ... {with parallel corrugations}
- [E04C 2/324](#) ... {with incisions or reliefs in the surface ([E04C 2/326](#) takes precedence)}
- [E04C 2/326](#) ... {with corrugations, incisions or reliefs in more than one direction of the element}
- [E04C 2/328](#) ... {slightly bowed or folded panels not otherwise provided for}

- E04C 2/34 .. composed of two or more spaced sheet-like parts ([E04C 2/32](#) takes precedence; spacers for cavity walls [E04B 2/44](#))
- E04C 2/3405 ... {spaced apart by profiled spacer sheets}
- E04C 2/36 ... spaced apart by transversely-placed strip material, e.g. honeycomb panels (honeycomb or other core members for layered products [B32B](#))
- E04C 2/365 {by honeycomb structures}
- E04C 2/38 .. with attached ribs, flanges, or the like, e.g. framed panels (concerned with attaching to other panels or elements to form a structure, see the places for the relevant structure, e.g. [E04B 2/00](#))
- E04C 2/382 ... {with a frame of concrete or other stone-like substance}
- E04C 2/384 ... {with a metal frame}
- E04C 2/386 ... {with a frame of unreconstituted or laminated wood}
- E04C 2/388 ... {with a frame of other materials, e.g. fibres, plastics}
- E04C 2/40 .. composed of a number of smaller components rigidly or movably connected together, e.g. interlocking, hingedly connected {of particular shape, e.g. not rectangular of variable shape or size, e.g. flexible or telescopic panels ([E04C 2/041](#) takes precedence)}
- E04C 2/405 ... {composed of two or more hingedly connected parts}
- E04C 2/42 .. Gratings; Grid-like panels (reinforcing elements [E04C 5/00](#); built-in gratings [E04F 19/10](#); gratings in general [F16S 3/00](#))
- E04C 2/421 ... {made of bar-like elements, e.g. bars discontinuous in one direction}
- E04C 2/422 {with continuous bars connecting at crossing points of the grid pattern}
- E04C 2/423 {with notches}
- E04C 2/425 {made of perforated bars}
- E04C 2/426 {with continuous bars that remain unconnected at crossing points of the grid pattern, e.g. with undulating bars}
- E04C 2/427 ... {Expanded metal or other monolithic gratings}
- E04C 2/428 ... {Separate connecting means, e.g. connecting gratings to underlying structure}
- E04C 2/44 . characterised by the purpose
- E04C 2/46 .. specially adapted for making walls ([E04C 2/52](#), [E04C 2/54](#) take precedence; structure of slab-shaped elements [E04B 1/02](#); walls of elements of relatively thin form [E04B 2/72](#))
- E04C 2/48 .. as high as or higher than the room, i.e. having provisions concerning the connection with at least two floors ([E04C 2/52](#) and [E04C 2/54](#) take precedence)
- E04C 2/50 .. Self-supporting slabs specially adapted for making floors ceilings, or roofs, e.g. able to be loaded ([E04C 2/52](#), [E04C 2/54](#) take precedence; structures of slab-shaped elements [E04B 1/02](#); floor structures [E04B 5/00](#); { roofs consisting of self-supporting slabs [E04B 7/20](#);} ceilings [E04B 9/00](#); roof coverings [E04D](#); floor coverings [E04F 15/00](#))
- E04C 2/52 .. with special adaptations for auxiliary purposes, e.g. serving for locating conduits ([E04C 2/54](#) takes precedence; block-shaped elements therefor [E04C 1/39](#); floor structures incorporating ducts [E04B 5/48](#))
- E04C 2/521 ... {serving for locating conduits; for ventilating, heating or cooling}
- E04C 2/523 {for ventilating}
- E04C 2/525 {for heating or cooling (solar heat collectors [F24J 2/04](#); heat storage [F28D 20/00](#))}
- E04C 2/526 ... {with adaptations not otherwise provided for, for connecting, transport; for

- making impervious or hermetic, e.g. sealings}
- E04C 2/528 {Impervious or hermetic panels not otherwise provided for}
- E04C 2/54 . . Slab-like translucent elements (floors for transmitting light [E04B 5/46](#); translucent or open-work ceilings [E04B 9/32](#), [E04B 9/34](#); translucent roof coverings [E04D 3/06](#), [E04D 3/28](#))
- E04C 2/543 . . . {Hollow multi-walled panels with integrated webs}
- E04C 2/546 . . . {made of glass bricks}

- E04C 3/00** **Structural elongated elements designed for load-supporting (as building aids [E04G](#))**

- E04C 3/005 . . {Girders or columns that are rollable, collapsible or otherwise adjustable in length or height (girders as supporting members for forms [E04G 11/54](#))}

- E04C 3/02 . . Joists; Girders, trusses, or trusslike structures, e.g. prefabricated; Lintels; Transoms; {Braces}([E04C 3/38](#) takes precedence; for structures characterised by movable, separable, or collapsible parts [E04B 1/343](#); {braced purlins [E04B 7/024](#))}
- E04C 3/04 . . of metal ([E04C 3/29](#) takes precedence; as reinforcing elements [E04C 5/06](#); manufacture [B21](#))
- E04C 3/06 . . . with substantially solid, i.e. unapertured, web ([E04C 3/10](#), [E04C 3/11](#) take precedence){honeycomb girders [E04C 3/083](#)}
- E04C 3/065 { with special adaptations for the passage of cables or conduits through the web}
- E04C 3/07 at least partly of bent or otherwise deformed strip- or sheet-like material
- E04C 3/08 . . . with apertured web, e.g. with a web consisting of bar-like components; Honeycomb girders ([E04C 3/10](#), [E04C 3/11](#) take precedence)
- E04C 3/083 {Honeycomb girders; Girders with apertured solid web}
- E04C 3/086 { of the castellated type}
- E04C 3/09 at least partly of bent or otherwise deformed strip- or sheet-like material
- E04C 3/10 . . . prestressed
- E04C 3/11 . . . with non-parallel upper and lower edges, e.g. roof trusses (arched girders, portal frames [E04C 3/38](#))
- E04C 3/12 . . of wood, e.g. with reinforcements, with tensioning members ([E04C 3/292](#) takes precedence)
- E04C 3/122 . . . { Laminated }
- E04C 3/125 . . . { End caps therefor}
- E04C 3/127 . . . { with hollow cross section}
- E04C 3/14 . . . with substantially solid, i.e. unapertured, web ({[E04C 3/127](#),})[E04C 3/17](#), [E04C 3/18](#) take precedence)
- E04C 3/145 { with special adaptations for the passage of cables or conduits through the web, e.g. reinforcements}
- E04C 3/16 . . . with apertured web, e.g. trusses ([E04C 3/17](#), [E04C 3/18](#) take precedence)
- E04C 3/17 . . . with non-parallel upper and lower edges, e.g. roof trusses
- E04C 3/18 . . . with metal {or other} reinforcements or tensioning members
- E04C 3/185 {Synthetic reinforcements}
- E04C 3/20 . . of concrete or other stone-like material, e.g. with reinforcements or tensioning members (reinforcing elements [E04C 5/00](#))
- E04C 3/205 . . . {with apertured web, e.g. frameworks, trusses ([E04C 3/26](#) takes precedence)}

- E04C 3/22 . . . built-up by elements jointed in line
- E04C 3/26 . . . prestressed ([E04C 3/22](#), [E04C 3/29](#) take precedence; Prestressing members [E04C 5/08](#))
- E04C 3/28 . . of other materials not covered by groups [E04C 3/40](#) - [E04C 3/44](#)
- E04C 3/285 . . . { of glass }
- E04C 3/29 . . built-up from parts of different material, {i.e. composite structures}
- E04C 3/291 . . . { with apertured web }
- E04C 3/292 . . . the materials being wood and metal
- E04C 3/293 . . . the materials being steel and concrete (concrete with internal reinforcements or tensioning members [E04C 3/20](#))
- E04C 3/294 of concrete combined with a girder-like structure extending laterally outside the element (light weight girders used as reinforcement [E04C 5/065](#); as part of a floor structure [E04B 5/23](#))
- E04C 3/30 . Columns; Pillars; Struts (not designed for end loading [E04C 3/02](#); posts, masts, as independent structures [E04H 12/00](#))
- E04C 3/32 . . of metal ([E04C 3/36](#) takes precedence)
- E04C 3/34 . . of concrete other stone-like material, with or without permanent form elements, with or without internal or external reinforcement, e.g. metal coverings ([E04C 3/36](#) takes precedence)
- E04C 3/36 . . of other materials not covered by groups [E04C 3/40](#) - [E04C 3/44](#); of a combination of two or more materials
- E04C 3/38 . Arched girders or portal frames (straight girders able to be bent [E04C 3/02](#); inflatable [E04H 15/20](#))
- E04C 3/40 . . of metal ([E04C 3/46](#) takes precedence)
- E04C 3/42 . . of wood, e.g. units for rafter roofs ([E04C 3/46](#) takes precedence)
- E04C 3/44 . . of concrete or other stone-like material, e.g. with reinforcements or tensioning members ([E04C 3/46](#) takes precedence)
- E04C 3/46 . . of other materials not covered by groups [E04C 3/40](#) - [E04C 3/44](#); of a combination of two or more materials
- E04C 5/00** **Reinforcing elements, e.g. for concrete; Auxiliary elements therefor** ({methods or devices for making reinforcing materials [B21D](#)}; material composition {[C04B](#)}, [C21](#), [C22](#); arrangements of reinforcing elements, see the relevant subclasses)

NOTE

In this group, the following terms or expressions are used with the meanings indicated:

- "reinforcing" means increasing any physical strength characteristic of the end product, e.g. compressive or flexural strength;
- "elements" includes relatively large bodies, e.g. steel bars, as well as relatively small discrete bodies of any form, e.g. glass fibres.

Discrete reinforcing elements, which are small compared with the reinforced building element, only characterised by their composition are classified in [C04B](#), e.g. steel fibres [C04B 14/48](#), plastic elements with a shape other than granular or fibrous [C04B 16/12](#)

- E04C 5/01 . Reinforcing elements of metal, e.g. with non-structural coatings [{\(E04C 5/08 takes precedence\)}](#)
- E04C 5/012 .. {Discrete reinforcing elements, e.g. fibres}
- E04C 5/015 .. {Anti-corrosion coatings or treating compositions, e.g. containing waterglass or based on another metal [\(coating of discrete reinforcing elements C04B 20/10\)}](#)
- E04C 5/017 ... {Anti-corrosion coatings or treating compositions containing cement}
- E04C 5/02 .. of low bending resistance
- E04C 5/03 ... with indentations, projections, ribs, or the like, for augmenting the adherence to the concrete
- E04C 5/04 ... Mats [{\(combined with reinforcing elements protruding out of the plane of the mat 5/06B; three-dimensional mats E04C 5/0636\); bases for plaster E04F 13/04\)}](#)
- E04C 5/06 .. of high bending resistance, i.e. of essentially three-dimensional extent, e.g. lattice girders [{\(anchorage devices specially adapted for balconies E04B 1/0038; supporting devices for connector reinforcing rods for concrete walls E04G 21/125\)}](#)
- E04C 5/0604 ... {Prismatic or cylindrical reinforcement cages composed of longitudinal bars and open or closed stirrup rods [\(E04C 5/0631 takes precedence\)}](#)
- E04C 5/0609 {Closed cages composed of two or more coating cage parts, e.g. transversally hinged or nested parts}
- E04C 5/0613 {Closed cages made of one single bent reinforcement mat}
- E04C 5/0618 {Closed cages with spiral- or coil-shaped stirrup rod}
- E04C 5/0622 {Open cages, e.g. connecting stirrup baskets [\(E04C 5/0609 takes precedence\)}](#)}
- E04C 5/0627 ... {Three-dimensional reinforcements composed of a prefabricated reinforcing mat combined with reinforcing elements protruding out of the plane of the mat [\(E04C 5/0645 takes precedence\)}](#)}
- E04C 5/0631 {Reinforcing mats combined with separate prefabricated reinforcement cages or girders [\(E04C 5/064 takes precedence\)}](#)}
- E04C 5/0636 ... {Three-dimensional reinforcing mats composed of reinforcing elements laying in two or more parallel planes and connected by separate reinforcing parts [\(E04C 5/0645 takes precedence\)}](#)}
- E04C 5/064 {the reinforcing elements in each plane being formed by, or forming a, mat of longitudinal and transverse bars}
- E04C 5/0645 ... {Shear reinforcements, e.g. shearheads for floor slabs}
- E04C 5/065 ... Light-weight girders, e.g. with precast parts [\(light-weight girders in general E04C 3/08, E04C 3/294\)](#)
- E04C 5/0653 { with precast parts}
- E04C 5/0656 { with lost formwork}
- E04C 5/07 . Reinforcing elements of material other than metal, e.g. of glass, of plastics, or not exclusively made of metal [\(metal elements with non-structural coatings E04C 5/01\)](#)
- E04C 5/073 .. {Discrete reinforcing elements, e.g. fibres}
- E04C 5/076 ... { Specially adapted packagings therefor, e.g. for dosing}
- E04C 5/08 . Members specially adapted to be used in prestressed constructions [{\(production of](#)

- E04C 2002/02 . characterised by specified materials ([translucent E04C 2/54](#))
- E04C 2002/04 .. of concrete or other stone-like material; of asbestos cement; {of cement and other mineral fibres};([E04C 2/26](#) takes precedence; material or manufacture [B28](#), [C04](#))
- E04C 2002/044 ... {of concrete ([E04C 2/049](#) takes precedence)}
- E04C 2002/045 with two parallel leaves connected by tie anchors
- E04C 2002/046 Flat anchors
- E04C 2002/047 Pin or rod shaped anchors
- E04C 2002/048 Bent wire anchors

- E04C 2002/30 . characterised by the shape or structure ([translucent E04C 2/54](#))
- E04C 2002/34 .. composed of two or more spaced sheet-like parts ([E04C 2/32](#) takes precedence; spacers for cavity walls [E04B 2/44](#))
- E04C 2002/3405 ... {spaced apart by profiled spacer sheets}
- E04C 2002/3411 Dimpled spacer sheets
- E04C 2002/3416 with cylindrical dimples
- E04C 2002/3422 with polygonal dimples
- E04C 2002/3427 with conical dimples
- E04C 2002/3433 with dimples extending from both sides of the spacer sheet
- E04C 2002/3438 with saddle-shaped dimples, e.g. eggcrate type spacer sheets
- E04C 2002/3444 Corrugated sheets
- E04C 2002/345 with triangular corrugations
- E04C 2002/3455 with trapezoidal corrugations
- E04C 2002/3461 with rectangular corrugations
- E04C 2002/3466 with sinusoidal corrugations
- E04C 2002/3472 with multiple layers of profiled spacer sheets
- E04C 2002/3477 ... spaced apart by tubular elements parallel to the sheets
- E04C 2002/3483 ... spaced apart by spacers stamped from the sheets
- E04C 2002/3488 ... spaced apart by frame like structures
- E04C 2002/3494 ... Apparatus for making profiled spacer sheets

E04C 2003/00 Structural elongated elements designed for load-supporting (as building aids [E04G](#))

- E04C 2003/02 . Joists; Girders, trusses, or trusslike structures, e.g. prefabricated; Lintels; Transoms; {Braces};([E04C 3/38](#) takes precedence; for structures characterised by movable, separable, or collapsible parts [E04B 1/343](#); {braced purlins [E04B 7/024](#)})
- E04C 2003/023 .. Lintels
- E04C 2003/026 .. Braces
- E04C 2003/04 .. of metal ([E04C 3/29](#) takes precedence; as reinforcing elements [E04C 5/06](#); manufacture [B21](#))
- E04C 2003/0404 ... beams, girders, or joists characterised by cross-sectional aspects
- E04C 2003/0408 characterised by assembly or the cross-section
- E04C 2003/0413 being built up from several parts
- E04C 2003/0417 demountable

E04C 2003/0421	.....	comprising one single unitary part
E04C 2003/0426	....	characterised by material distribution in cross section
E04C 2003/043	.....	the hollow cross-section comprising at least one enclosed cavity
E04C 2003/0434	.....	the open cross-section free of enclosed cavities
E04C 2003/0439	.....	the cross-section comprising open parts and hollow parts
E04C 2003/0443	....	characterised by substantial shape of the cross-section
E04C 2003/0447	.....	circular- or oval-shaped
E04C 2003/0452	.....	H- or I-shaped
E04C 2003/0456	.....	{ hollow flanged, i.e. "dogbone" metal beams }
E04C 2003/046	.....	L- or T-shaped
E04C 2003/0465	.....	square- or rectangular-shaped
E04C 2003/0469	.....	triangular-shaped
E04C 2003/0473	.....	U- or C-shaped
E04C 2003/0478	.....	X-shaped
E04C 2003/0482	.....	Z- or S-shaped
E04C 2003/0486	...	Truss like structures composed of separate truss elements
E04C 2003/0491	....	the truss elements being located in one single surface or in several parallel surfaces
E04C 2003/0495	....	the truss elements being located in several non-parallel surfaces